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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/738,459	12/17/2003	James M. Tour	11321-P060US	9579

7590 09/12/2006

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Dallas, TX 75201

EXAMINER
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WONG, EDNA

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 09/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/738,459

Applicant(s)

TOUR ET AL.

Examiner

Edna Wong

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date July 17, 2006.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

This is in response to the Amendment dated July 31, 2006. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Response to Arguments***

#### **Double Patenting**

I. Claims 1-18 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-11 of copending Application No. 10/764,092.

The rejection of claims 1-7 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-11 of copending Application No. 10/764,092 is as applied in the Office Actions dated September 29, 2005 and March 28, 2006 and incorporated herein. The rejection has been *maintained* for the following reasons:

Applicants state that if the "provisional" double patenting rejection is the only rejection remaining in the Application, then the Examiner should withdraw the rejection and permit the Application to issue as a patent.

In response, the provisional double patenting rejection is not the only rejection remaining in the Application.

II. Claims 1-18 have been provisionally rejected under the judicially created doctrine

of obviousness-type double patenting as being unpatentable over claims 1-28 of copending Application No. **10/738,168**.

The rejection of claims 1-7 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 of copending Application No. 10/738,168 is as applied in the Office Actions dated September 29, 2005 and March 28, 2006 and incorporated herein. The rejection has been *maintained* for the following reasons:

Applicants state that if the "provisional" double patenting rejection is the only rejection remaining in the Application, then the Examiner should withdraw the rejection and permit the Application to issue as a patent.

In response, the provisional double patenting rejection is not the only rejection remaining in the Application.

Claim Rejections - 35 USC § 103

I. Claims **1-7** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Hong et al.** ("Synthesis of Carbon Nanotubes by Microwave Heating", *Proceedings of the Sixth Applied Diamond Conference/Second Frontier Carbon Technology Joint Conference (ADC/FCT 2001)*, July 1, 2001, pp. 805-809) in combination with **DE 3915044 ('044)**.

The rejection of claims 1-7 under 35 U.S.C. 103(a) as being unpatentable over Hong et al. in combination with **DE 3915044 ('044)** has been withdrawn in view of

Applicants' remarks.

II. Claims 8-9 and 11-18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Hong et al.** ("Synthesis of Carbon Nanotubes by Microwave Heating"; *Proceedings of the Sixth Applied Diamond Conference/Second Frontier Carbon Technology Joint Conference (ADC/FCT 2001)*, July 1, 2001, pp. 805-809) in combination with **DE 3915044** ('044).

The rejection of claims 8-9 and 11-18 under 35 U.S.C. 103(a) as being unpatentable over Hong et al. in combination with DE 3915044 ('044) has been withdrawn in view of Applicants' remarks.

III. Claim 10 has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Hong et al.** ("Synthesis of Carbon Nanotubes by Microwave Heating", *Proceedings of the Sixth Applied Diamond Conference/Second Frontier Carbon Technology Joint Conference (ADC/FCT 2001)*, July 1, 2001, pp. 805-809) in combination with **DE 3915044** ('044) as applied to claims 8-9 and 11-18 above, and further in view of **Holzinger et al.** ("Sidewall Functionalization of Carbon Nanotubes", *Angew. Chem. Int. Ed.* (2001), Vol. 40, No. 21, pp. 4002-4005).

The rejection of claim 10 under 35 U.S.C. 103(a) as being unpatentable over Hong et al. in combination with DE 3915044 ('044) as applied to claims 8-9 and 11-18 above, and further in view of Holzinger et al. has been withdrawn in view of Applicants'

remarks.

### ***Response to Amendment***

#### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

I. Claims **19-27** are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-11 of copending Application No. **10/764,092** (Tour et al.). Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application

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since the referenced copending application and the instant application are claiming common subject matter, as follows:

(a) irradiating carbon nanotubes with microwaves.

The independent claims of the instant application recite similar limitations, either alone or in combination with their dependent claims, as that of the claims of the copending application wherein the claims of the instant application are encompassed by the claims of the copending application. Therefore, the claims would have been obvious variants over each other.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

II. Claims **19-27** are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 of copending Application No. **10/738,168** (Tour et al.). Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows:

(a) irradiating carbon nanotubes with microwaves.

The independent claims of the instant application recite similar limitations, either

alone or in combination with their dependent claims, as that of the claims of the copending application wherein the claims of the instant application are encompassed by the claims of the copending application. Therefore, the claims would have been obvious variants over each other.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

I. Claims **1 and 3-7** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Hong et al.** ("Synthesis of Carbon Nanotubes by Microwave Heating", *Proceedings of the Sixth Applied Diamond Conference/Second Frontier Carbon Technology Joint Conference (ADC/FCT 2001)*, July 1, 2001, pp. 805-809) in combination with **DE 3915044 ('044)**.



Hong teaches a method comprising a step of:

irradiating acetylene with microwaves to yield a plurality of carbon nanotubes (page 805, abstract).

The microwave radiation comprises a frequency that ranges from about 0.01 GHz to about 100 GHz (= 2.45 GHz) [page 806, "Synthesis and Characterization"].

The frequency ranges from about 1 GHz to about 18 GHz (= 2.45 GHz) [page 806, "Synthesis and Characterization"].

The microwave radiation is generated by a magnetron with a power that ranges from about 1 W to about 10,000 W (= 800 W) [page 806, "Synthesis and Characterization"].

The power ranges from about 10 W to about 1,000 W (= 800 W) [page 806, "Synthesis and Characterization"].

The method of Hong differs from the instant invention because Hong does not disclose the following:

- a. Wherein the plurality of carbon nanotubes is a plurality of crosslinked carbon nanotubes, as recited in claim 1.
- b. Wherein the plurality of crosslinked carbon nanotubes comprises at least one junction formed via a rearrangement of carbon atoms, as recited in claim 7.

Hong teaches a plurality of carbon nanotubes (page 805, abstract).

Hong teaches that various shapes of carbons were observed including CNTs,

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nanofibers, nanoparticles and amorphous carbons (page 805, abstract).

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Hong teaches growing the CNTs (page 807, Fig. 1(b)). Growing the CNTs would have meant that their increase in size was by accretion of material from *parent CNTs* by the microwave irradiation.

Furthermore, Hong teaches a similar process as presently claimed. Similar processes can reasonably be expected to yield products which inherently have the same properties. *In re Spada* 15 USPQ 2d 1655 (CAFC 1990); *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155 (CCPA 195).

Furthermore, the discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior's art functioning, does not render the old composition patentably new to the discoverer (MPEP § 2112(I) and MPEP § 2145 (II)).

Furthermore, the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

c. Wherein the microwave radiation is generated by a magnetron, as recited in claim 5.

DE '044 teaches that a magnetron generates a microwave emission (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the microwave oven described by Hong with wherein the microwave radiation is generated by a magnetron because a magnetron would have generated a microwave emission as taught by DE '044 (abstract).

II. Claims 8, 11-12 and 14-18 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Hong et al.** ("Synthesis of Carbon Nanotubes by Microwave Heating", *Proceedings of the Sixth Applied Diamond Conference/Second Frontier Carbon Technology Joint Conference (ADC/FCT 2001)*, July 1, 2001, pp. 805-809) in combination with **DE 3915044** ('044).

Hong and DE '044 are as applied for reasons as discussed above and incorporated herein.

The method of Hong differs from the instant invention because Hong does not disclose the following:

a. Wherein the plurality of carbon nanotubes is a plurality of crosslinked carbon nanotubes, as recited in claim 8.

b. Wherein crosslinking is generated between the sidewalls of adjacent carbon nanotubes, as recited in claim 8.

- c. Wherein the crosslinking comprises covalent bonds, as recited in claim 11.
- d. Wherein the covalent bonds are carbon-carbon bonds, as recited in claim 12.

Hong teaches a plurality of carbon nanotubes (page 805, abstract).

Hong teaches that various shapes of carbons were observed including CNTs, nanofibers, nanoparticles and amorphous carbons (page 805, abstract).

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Hong teaches growing the CNTs (page 807, Fig. 1(b)). Growing the CNTs would have meant that their increase in size was by accretion of material from *parent CNTs* by the microwave irradiation.

Furthermore, Hong teaches a similar process as presently claimed. Similar processes can reasonably be expected to yield products which inherently have the same properties. *In re Spada* 15 USPQ 2d 1655 (CAFC 1990); *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155 (CCPA 195).

Furthermore, the discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior's art functioning, does not render the old composition patentably new to the discoverer (MPEP § 2112(I) and MPEP § 2145 (II)).

Furthermore, the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA

1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

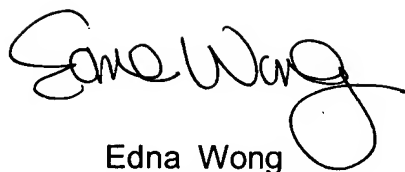
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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A handwritten signature in black ink, appearing to read "Edna Wong". The signature is fluid and cursive, with the first name "Edna" and last name "Wong" clearly distinguishable.

Edna Wong  
Primary Examiner  
Art Unit 1753

EW  
September 11, 2006